



TITLE:

The β -ray Counter of the Methane Flow Type

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— Abstracts of Papers —

The following 39 papers are the first part out of 77 papers, read at the semi-annual meeting of the Institute from 24th to 26th November, 1950.

1. The β -ray Counter of the Methane Flow Type

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A β -ray proportional counter of flow type which was very convenient for the measurements with low energy β -active isotopes such as C^{14} or S^{35} , was designed. It has the various advantages compared with an ordinary counter. Firstly, it has no need of evacuation and can therefore be used immediately after putting together. Moreover, since it can be operated at an atmospheric pressure, the window can be made extremely thin (for example, 0.18 mg/cm² collodion foil of 35 mm ϕ) or, when necessary, be removed entirely, and the sample to be measured can be directly put on the aperture of the counter. The Geiger-Müller counter has a certain finite lifetime, owing to the decomposition of the complex gas molecules by the discharge in the counter. Our counter on the contrary, has an almost infinite lifetime, so long as the methane gas is supplied.

Much careful attention was paid to the details of the counter. The counter is shielded by a grounded metal cylinder from the outer electrical disturbances. Moreover, there is a guard ring between the central wire and the counter wall on which the negative high potential is applied, in order that the electrical leakage to the central wire through the insulator surface may not give rise to a spurious count. The methane gas is supplied through a drying vessel containing $CaCl_2$ from a commercial cylinder or a methane gas generator with aluminium-carbide and water. There is also provided a simple bubble flow meter and a safety valve which protects the thin window foil from breaking off by an accidental rise of the gas pressure. The characteristic curve is also good enough and has a plateau range from 3600 V to 3800 V with a rise of 15 %, when the counter tube is 2 cm in diameter and 2 cm in length. The natural background is counted 11.4/min at the middle of the plateau.